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Institutional variety and the future of economics

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Abstract
Economics depends heavily on assumptions made about the phenomenon of institutional variety and its implications for technological capabilities in economic development. This article contributes to new ways of thinking of institutional variety in order to advance scientific argument within the broad tradition of evolutionary political economy (EPE). First, it draws on the *Nyāya* (Hindu) systems of logic and reasoning about inference and judgement which can potentially reveal inter-and intra-paradigmatic differences for EPE and economics. Second, it uses four brief illustrative cases from the author's development research on technological learning and innovation to argue for more explicit and systematic treatment of inference and judgement about institutional variety. Implications for the future of economics are briefly discussed.

Keywords Technology · Development · Institutions · Inference · Economics · Evolutionary political economy · Evolutionary economics

JEL classification B41 Economics Methodology · D02 Institutions: Design, Formation, Operations, and Impact · O12 Microeconomic Analyses of Economic Development · O14 Industrialization, Manufacturing and Service Industries, Choice of Technology · O33 Technological Change: Choices and Consequences, Diffusion Processes · B25 Historical, Institutional, Evolutionary, Austrian, Stockholm School

1 Introduction

Despite substantial debate and dissent, the process of development in economics is seen with some considerable consensus as one of institutional change,

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especially the change of dominant institutions such as markets. Economic historians and economic development scholars, however, have recognized that development involves phenomena which may not be easily recognizable within existing conceptual frameworks nor reconciled into empirical patterns or policy clarity that can be easily extended from already industrialized economies. For example, the process of industrial development, and with it the wide and varied attempts by firms and states of technological learning and innovation, reveals considerable institutional variety.

Implicit in the policy advice is recognizing some institutional variation, yet viewing the transformation of economies as processes of inevitable institutional convergence or of dominant institutions such as markets becoming more "perfect." In this sense, development economics has been an arena of considerable dissent about the microeconomic assumptions of institutional change and the narrow reading of markets. Furthermore, policy advice from development agencies can push countries to mimic those of industrialized economies from several decades earlier, such as South Korea, or suggest to democracies that authoritarian transitions may be copied.

The stakes are high for countries to manage their institutional change process, but also for economics to justify how it infers such change from situations where considerable variety exists. This paper provides a preliminary conceptual approach by asking how one might reconcile different theoretical frameworks about institutional variety under the umbrella of evolutionary political economy (EPE). What inferences can be drawn from the phenomena of variety of institutions such as markets and firms? Development economics is a study of phenomena dependent on inferences about institutional variety and its consequences for technological capabilities and development. Using four brief composite cases drawing from the author's development research, the paper focuses on the conceptual frameworks and taxonomy of inference and judgment in economics. How, why, and what scholars differently infer from the phenomena of institutional variety matters to economics and to theories and policies of technological capabilities, especially for learning and innovation in industrial advance. The paper lays out the argument that more systematic treatment within evolutionary political economy, across frameworks for innovation and learning, can advance the field of development and economics.

The next section outlines in more detail the scientific process of economics, the potential advantages of drawing from alternate systems of inference such as the Nyaya school that well predates Cartesian thinking and the opportunity presented by revealing such assumptions of inference and judgment in evolutionary political economy (EPE). Section 3 then details the specific intra-paradigmatic conceptual context of institutional variety. The example used is the study of technological learning and innovation literature regarding economic development in "late" industrial nations. Section 4 presents four brief cases to further a taxonomy of intra-paradigmatic challenges in the evolutionary political economy tradition. Section 5 derives from the four development cases to discuss potential benefits of EPE for economics' advance.

2 Economics' inference challenge from institutional variety

Kuhn (1962) famously framed science's evolution through paradigms as competition between hypotheses and heavily mediated by a community of science practice to resolve the rules of evidence by which one hypothesis and its paradigms were deemed superior. The advance of competing hypotheses then establishes a sequence of possible dominant theories at any time, with contemporaneous hypotheses struggling to establish alternate paradigms and methodologies. Contemporary development economics can benefit from this form of explicit attention to paradigm-construction and theory evolution. However, economics poorly fits the Kuhnian perspective of strictly competing hypothesis resolution and neither seems to denote "revolution" nor "normal" science (Baumberger 1977). Rather, contested communities of practice, mainstream and heterodox, remain without a shared understanding of the relationships between phenomena, methods, inference, and hypothesis development. Lee (2012), for example, differentiates an economics that can engage diverse extant theoretical views across paradigms, and is able to learn from the history of economic thought, policy engagement, and theoretical changes. This proclivity to source from phenomena is a characteristic of science, but the ability to engage in cross-paradigmatic theory building may be distinctive to "heterodox" or "pluralist" economic traditions such as evolutionary political economy (EPE) (Dequech 2007; Dow 2008; Lee 2012).

Development study in economics may thus benefit using the lens of the pluralist tradition of evolutionary political economy (EPE) to engage in inter-paradigmatic and intra-paradigmatic theory construction especially around the phenomena of institutional variety. Variety broadly can be characterized as "the number of actors, activities, and objects necessary to characterize the economic system" (Saviotti 2001, 120), and can be manifested in new products, sectors, and productivity growth in existing sectors (ibid.). The variety of "actors, activities, and objects" is held together in economic activity by institutions, which constitute a range of norms and rules through which human societies function. From a development standpoint, economics must contend with multiple ways in which these institutions are constituted, i.e., institutional variety, and so must the design of development policy. A one-size-fits-all development policy is a misnomer. Therefore, an explanation of the existence of institutional variety cannot rely on ex-post analysis to contrast industrialized and industrializing economies (Arocena and Sutz 2000). Institutional variety has no single interpretation across major schools. While growth theories treat the growth of variety as an ex-post product of economic development, requiring little explanation, Schumpeterians see institutional variety as central to economic development (Saviotti 2001). Similarly, for labor economists, the explanation for the large variation in types of work (often termed "informal") is sharply distinct in economics based on how the political economy and social custom of regulation of industrial work itself is framed (e.g., Portes et al. 1989 versus Maloney 2004). Therefore, open questions regarding the empirical reality of firms and regulation remain. However, rather than beginning with incommensurate paradigms, the phenomena of variety in real-world engagement can drive theory construction and policy framing in turn: under what conditions is institutional variety "good" for development policy? Does it disappear as countries converge on GDP per capita? What

policy environments sustain such variety? Relevant for this paper, can the wider conceptual umbrella of EPE be used systematically to help us advance the discipline of economics?

Extending Saviotti (2001), but also scholars such as North, institutional variety can be defined as "a variety in the norms, customs, and rules through which the economy functions." These norms, customs, and rules may be national policies or laws within which firms function, "softer" attributes of how firms work (e.g., creativity, implicit norms of discrimination, reward for innovation), as well as international context of technical standards of trade or intellectual property harmonization rules. Furthermore, organizational variety (size and nature of firms, for example) can be viewed as a subset of institutional variety since organizations also embody implicit or explicit norms, customs, and rules through which the economy functions. While the existence of institutional variety may be agreed upon, no such consensus in economics arguably exists for studying and inferring from single or multiple institutions. In large part, this gap in theorizing is both a cause and effect of studying some dominant institutions such as markets but neglecting others such as the state or its strategic policies or key stakeholders, e.g., industry associations or universities (Papaioannou and Srinivas 2019; Arocena and Sutz 2000). The paradigmatic core of "mainstream" economics has focused on markets as a primary institution and explanatory variable although developing countries have an especially complex variety of economic activity and breadth of firms (Srinivas 2012; Srinivas 2018a). Variety matters because institutional change does not occur singly. Combinations of institutions matter; the institutional variety includes both markets and other institutions, requiring combinatorics (Amable 2000) and heuristics (Srinivas 2012). Srinivas (2012) distinguishes between institutional "menageries" and "zoos." The former were repositories of exotic fauna but enjoyed only as private collections of exotica and splendor, while "zoos" were for public display and access, and furthered the goals of research and education. Economics must open up its institutional variety, especially its market menageries, to closer scrutiny.

The lack of clarity regarding institutional variety is intimately tied to observation and subsequent inference and judgment. Dow (2009) surmises that exercises in judgment are lacking in curricula and result in economists somewhat haphazardly facing the real-world scenarios they must inevitably comment upon: "The nature of judgment is seldom discussed in economics, yet clearly it is critical for economists in practice when applying what they have learnt to real-world situations. It is important therefore that economics education should equip students by training them in judgment. This requires that the curriculum cover different types of argumentation and exercises in putting them together in order to arrive at a coherent conclusion." (Dow 2009, 48). Yet, inference does not proceed to judgment without hiccups. Judgment itself follows prior skills, which are equally if not more neglected, including awareness of phenomena and subsequent inference. Establishing pathways to judgment requires attention to personal knowledge especially that in answer to judgements that inevitably must evolve in response to religion. Michael Polanyi, scientist, in response to deepening interest in Christian theological inquiry devised his own philosophical question of judgment and evidence from the standpoint of personal knowledge versus universals: "All knowledge is … either tacit or rooted in tacit knowing", rejecting a Cartesian comprehensive or

universal doubt, yet stating: "We must form our convictions, knowing their limitations, and do the best we can", while later discussing "Intelligence and Responsibility" for an approach to action (Scott 2005, 9, 11).

In order to tackle uncertainty about the inferential foundations of the discipline, preceding characteristics of exposure to phenomena matter. Judgment requires other capabilities including perception itself, self-awareness, awareness of surroundings, contextual clues, sensitivity to social norms, and heightened self-confidence of ignoring the busy mind when required to attend to sensory inputs or consciousness-raising approaches in unfamiliar surroundings. In some respects, one can frame this process as going deep rather than going wide, becoming more confident that a phenomenon exists, is worthy of conjecture, and the ability to compare and contrast it with other phenomena that can be described as distinct or related.

The striving to develop an alternate, more precise approach to human knowledge and inference has established economics roots in Cartesian inquiry especially the emphasis on rationality and logic, but the worsening narrow psychological and behavioral character of homo economicus, overextended without sufficient attention to man's inner nature. Western (especially Greek) philosophy's selective impact on economics has further generated a distinctive historical path for inference and moral political economy's separation of scholarly disciplines from theology to neuroscience, and economics to psychology. However, older systems exist, written out of much academic scholarship on critical thinking and logic and pigeon-holed into area studies, ignoring their unique and powerful contribution to training in making inferences and leading to a public philosophy relevant to social challenges (Vaidya 2017). Specifically, these systems of the philosophy and science of knowledge and its sources, *pramāṇa-śāstra* (in the language of Sanskrit or Saṃskṛtam), seen in the six Vedic schools of *Sanatana Dharma* (Hinduism) offer more promising detailed logical and psychological bases of inference and judgment for EPE. Specifically, the *Nyāya* school (~2 BCE) pivots on fundamental questions of sources of knowledge and institutions (rules, norms, laws). The six schools and particularly *Nyāya* precede and reconcile the role of framing, the psychological basis for inference, and the difficulty of using inference to convince others of interpretation and, by extension, to judgment. Importantly, traditional separation of Western scholarly disciplines (e.g., economics, psychology) is not followed. More expansive questions can be pursued through logic, experiment, and example, such as whether the objects of perception are internal or external to one's consciousness, or voluntary and reliable as sources of knowledge (see also Dasti 2013). *Nyāya* philosophy situates judgment within the context of the concern with wrong knowledge leading to delusion, with specific concepts such as *Pratyakṣa* (perception), *Anumāna* (inference, mediated knowledge), and *Vyā'pti* (invariable relation). These are set firmly against the backdrop of observation and consciousness.

Briefly drawing on these alternate logics and methods, a possible viewpoint is that disciplinary disagreements in economics arise from disagreements of *vyā'pti*, the invariable relation between two facts. The *Vedanta* School similarly offers significant contributions to the practice of disinterested witnessing and its impact on phenomenology. A full exposition is impossible here, but even evolutionary political economy approaches may recognize similar but not equal or complete phenomena: strictly, *vyā'pti* is difficult to establish. Especially relevant is the clear difference between *svārthānumāna* or *parārthānumāna*, or inference for

one's personal convictions (what Polanyi may call personal knowledge) and that required to convince others, having different burdens of proof of knowledge. In other words, while the mainstream and more pluralist traditions can be seen as unconvinced of the *parārthānumāna* that the others seek to establish, they may within their own "camp" (EPE itself in this case being a wide enough umbrella) be ready to extend the conversation of what propositions are shared or sufficient in order to be convinced. Consequently, it may be valuable to note that economics' institutional analyses may draw on widely varying roots in philosophical traditions of consciousness and cognition, resulting in diverse historical and cultural approaches to development phenomena and in stark contrast to industrialized (Western) patterns. These phenomenology roots may generate conflicting views of what is seen even when the formal institutions of a society (national laws or ideas of justice) may be shared. However, in order to develop such propositions and confidence in the basis of knowledge, conditional though it may be, it requires exposure and debate of what phenomena mean to *pratyaksha*, or perception.

Yet, economics departments unlike policy schools unevenly expose students to diverse methods of "fieldwork" or primary data collection, lessening the scope of the phenomena they are exposed to and ability to reconcile multiple viewpoints about single phenomena. "Minor" professions with professional engagement in the real world, such as social work or planning and policy, do this much better, where dependence on dogmatic disciplines is arguably less absolute and pedagogy includes methods of professional practice of interpretation, mediation, and reconciliation (Glazer 1974). These professions have curricular emphasis on observation, problem-framing, and problem-solving. Similarly, other Vedic schools alert one to phenomena and perception, but also false knowledge and a means of liberation. Observation precedes data collection, requires slowing down, of attention to the context of consciousness in which observable phenomena are resolved into cognitive frames of reference, then to response and inference and its pathways to diverse conclusions. When analysis of similar phenomena results in different inferences about institutional variety, only some may develop into systematic hypotheses in the service of scientific enquiry. In other words, the discipline of economics has not systematically resolved types of agreement, its foundational propositions about complex phenomena, *vyā'pti* (the relation) and *anumāna* (inference). Thus, it remains unconvincing within its boundaries at least in part because it lacks a consensus approach to convincing others in the discipline (what the *Nyāya* school calls the challenge of *parārthānumāna*).

Consequently, while they have many shared attributes, there is nothing neatly tied up within economics about how inference and the exercise of judgment then proceed to interpretation of the economy. That inference precedes judgment offers a challenge inherent to economics' education (Dow 2009), yet long periods of economics advance may not resolve, either through co-existence or revolution, what the discipline's foundations, approach to invariant relations, or sources of knowledge may be. Baumberger (1977, 10): "In a sense, economics provides the counter-example *par excellence* to physics. But, as does physics, it fails to illustrate and support Kuhn's schema. Whereas in physics we look in vain for the period of the revolutionary mode of behavior, in economics we are at a loss to find the period of the normal science mode of behavior." More specifically, a "physics-imitation complex" devoid of context and

inference makes traditional economists struggle to read different types of historical data, or expand beyond routine methods. The discipline added stochastic terms to constrained optimization formulae instead of focusing on reformulation from what stochastic behavior meant for theory, which physics had successfully done, "[…] these stochastic "shocks" had little or no theoretical justification, but themselves seemed only an excuse to maintain the pure deterministic ideal of explanation in the face of massive disconfirming evidence." (Mirowski 1990, 291). Competing hypotheses are not fairly resolved in mainstream economics, or over-generalized, hoping for a "grand unified theory," and lacking "historical specificity" (Hodgson 2002) EPE scholarship can contribute to scientific clarity by making more evident its own inter-paradigmatic as well as intra-paradigmatic inferences, and the propositions required to convince others under the same umbrella.

3 Technological learning and innovation: toward a conceptual taxonomy

A discussion regarding inference about institutional variety provides a way to move between schools of thought even in more pluralist traditions, as we will see, on the issue of technological learning and innovation, perhaps what in the older Vedic and *Nyāya* tradition in particular could be termed *Upamāna* or proceeding through comparison and analogy, which forms a valid basis for conditional knowledge. For instance, the history of economic thought and long-arc narrative explanations for theories of growth (such as of Gerschenkron 1962) center their explanations as explicit interpretations of institutional change (Lee 2012; McCloskey 1983). In Gerschenkron's (1962) schema, industrialization is a process of institutional change that is state-led; institutions such as finance and banking are created by the state to drive industrial development. Each "late" industrial nation may weave this state-led institutional mix in different ways. Each institutional mix offers a difficult brew of learned "social capabilities" (Abramovitz 1986) that delivers developmental goals in industrial transformation. The institutional variety is recognized in the long arc as essential to explanations of technological capabilities and draws on an essentially evolutionary political economy of learning. Ambiguity between the political economy traditions may reflect important differences of units and scales: for example, that GDP growth is best viewed through industry sector growth, or manufacturing value addition, or even learning within certain types of firms or across tasks, products or platforms. Amsden (1989) for example argues that what the World Bank termed the East Asian "Miracle" of *laissez faire* was rather systematic state intervention that accelerated the building of technological capabilities and of specific types of learning for national firms. Thus, within innovation and learning scholarship, while broadly consistent with EPE, there are important differentiating assumptions about units of analysis (e.g., nation-states versus firms), protagonists (e.g., indigenous firms versus multinationals, NGOs or universities), and more frequently mixed methods (e.g. diverse qualitative case studies, simulations, agent-based modeling). However, despite these differences, EPE has several intra-paradigmatic advantages for economics: evolutionary theories have a distinctive advantage in "the explanation of situations characterized by qualitative change, radical uncertainty, and the heterogeneity of agents and techniques" (Saviotti

1997). The variety generated by these different conditions and responses by agents provides the basis for institutional theories of the dynamics of change versus those of order (Dosi and Orsenigo 1988; Nelson and Winter 1982). However, no single framework of evolutionary economics is easily able to contend with this heterogeneity either to explain order or change (Robert et al. 2017).

Variety bridges those approaches focused on modeling without qualitative change and those that are more descriptive approaches of variety in economic development (Saviotti 1994): e.g., Kuznets (1965) on agriculture and industry dynamics; Romer (1987) on growth of capital goods; and Pasinetti's (1981, 1993) saturation of demand as a limit to variety and growth (see Saviotti 2001, 121). Institutional variety can be inferred to be either central or tangential to economic development processes; for example, the phenomena of "informal" work and firms can be variously analyzed based on combinations of institutions in terms of capitalist exploitation, of dualism, of regulation and free markets, or agility and entrepreneurship. The meso-level analysis of institutional variety may result in *udharana* (examples) with applications in economic geography such as cluster development analysis, where institutional variety can prompt movement toward integration mechanisms (Grillitsch and Asheim 2017).

EPE can better reveal this breadth and ponder the hurdles to reconciliation. For example, Schumpeterian frameworks for innovation and learning are likely to assert that institutional variety matters to the engine of innovation and entrepreneurship because it endogenizes the bi-directionality of entrepreneurship and investment financing (Dewick and Hernandez 2014). Yet, the division between institutional and organizational variety that can be presumed to be both evident and positive for innovation may not be so clear for wider development, if the coordinating mechanisms are less clearly understood or altogether absent (e.g., Mehaut et al. 2010; Pascha et al. 2011).

4 Methodology: taxonomy development of institutional variety

Rather than a traditional methodology of application or evaluation which can be built on foundations of some certainty, this section focuses on the ontology and epistemology of taxonomy development in how institutional variety can be approached. The question of inference and judgment is the centerpiece of greater explanatory precision. Differentiating between competing hypotheses in economics, even within intra-paradigmatic communities such as EPE, is not driven by agnostic methods (Hodgson 2002). A narrative whose core is a phenomenon of heterogeneity necessarily approaches the task through "colligation" from the history of science (Roberts 1996) which attempts to generate frameworks of explanation and a general hypothesis from seemingly mismatched heterogeneous phenomena (see Dumez and Jeunemaitre 2006, also comparison and analogy of *Upamāna*). In both Western philosophy and Vedic, such comparison becomes a system of resolution also evident in creating law. For instance, differentiating between industrial pathways and their institutional variety opens up the black box of nomenclature and policy legitimacy such as that of the "Global South," which has succeeded in emphasizing developmental solidarity but ceased to have much analytic power to study the specifics of technological learning and innovation (Srinivas 2018b). Such comparison and analogy offer early approaches to

narrative strengthening, and are consistent with the Kuhnian notion that paradigms in "normal science" may be incommensurate. For economics, this translates into the inability of empirical (quantitative) strategies to differentiate between theories, of persistence in the use of mathematics as the primary means of resolution between arguments, and the need of building arguments beyond mathematics (see Dow (2009, 46-48)).

As we have discussed, in the different systems of reasoning show, the development of knowledge about phenomena is premised on how one makes viable assumptions about the validity of inference for reliable judgment. A system of propositions, either partial or whole, defines how personal experience and inference (what Polanyi terms tacit knowledge) might be related also to that with which we can convince others (in the *Nyāya* school, the *sarvānumāna* versus *parārthānumāna*) Furthermore, even where comparable foundations may be assumed, new relations (*Vyā'pti*) can be elaborated perhaps only in a single direction, or without preferred propositions intact. In economics, the divide between mainstream versus more pluralist traditions is less important than the pragmatic and possibly even progressive principle that inquiry can advance even among those that largely agree.

Four cases from the author's published research are briefly presented to demonstrate how phenomena may be classified and studied. We proceed with three assertions to analyze narratives in more detail.

Assertion 1: Institutional variety in industrial development is a phenomenon requiring conceptual frameworks and methods from which inference is made more explicit.

Assertion 2: Institutional variety is contested within evolutionary political economy (EPE) approaches.

Assertion 3: An intermediate taxonomy with the use of simple visual and qualitative heuristics can lay bare inference and judgment about innovation and learning.

The 4 brief cases represent different levels of analysis from nation-state to product innovation.

4.1 Case 1: Institutional variety across industrializing nation-states

Economic development history has underscored the diversity of national pathways. The nation-state offers a major context for inference about institutional variety, and particularly post-colonial nation-building points to the difficulty of embracing an industrially homogenous or necessarily politically cohesive "Global South" (Srinivas 2018b). The framers of the diverse national industrial plans sought to present political alliances such as the Non-Aligned Movement (NAM) as the basis of breakaway from the Cold War. NAM's claim of national development autonomy presented a new front for global legitimacy.

Post-colonial nation-building indeed generated some shared patterns of development such as land held by a minority, displacement and precariousness of work, and divisions enhanced during colonial rule, of language, religion, and income. Pivotal historical moments such as the Bandung conference in 1955 underscored that while some types of political solidarity may have been aspirational for NAM in theory, members in practice sought diverse policy approaches and driving concepts from their economic advisors. Macro-level goal-setting and policy agenda-setting were sourced from Marx to Rostow, Mahalanobis, Solow or Lewis without clear implications for

institutional variety or learning. Lewis (1954) for instance does offer propositions for "learning islands" and unlimited supplies of labor and begins with variety in labor practices, but does not make explicit assertions for why institutional variety exists or grows in the context of different learning types.

Given the limited range of stated political allegiances of NAM members, economic development pathways were surprisingly prolific. NAM nations broke away among themselves and from traditional Cold War militarization and the polarization through distinctive decisions on investment, diversification, specialization, and technology transfer. Solidarity priorities mostly remained in the realm of disarmament, environmental improvements, reduced racial discrimination, as well as indigenous and human rights (Berger 2001; Tan and Acharya 2008; Nesadurai 2005). "Panchsheel" (the 5 pillars, April 28, 1954) elaborated by India as an important leader within the Non-Aligned Movement (NAM) and allies such as Ghana, Egypt, Indonesia, and the former Yugoslavia, sought for consensus of "mutual co-existence" with non-aggression, sovereignty and territorial integrity, non-interference in internal affairs, mutual non-aggression, and peaceful co-existence. Value priorities for nation-building differently affected the character of domestic economic realities of trade and technology transfer and the degree to which technological learning and innovation capabilities were prioritized relative to more rudimentary imports. Contrasting elements of "Panchsheel" were interpreted in the New International Economic Order and initiated by several NAM members in the 1970s through the United Nations Conference on Trade and Development (UNCTAD). The splits evident earlier resulted in different industrial paths, dramatically different technological capabilities 60 years later, and dynamic membership of diverse geopolitical clubs: "[…] uniform 'Southern' qualities were clearly analytically insufficient [..] to explain breakaway countries and regions" (Srinivas 2018b). NAM members strengthened the United Nations' Economic and Social Council (ECOSOC), but differed sharply in their continued alliances with Cold War powers and strategic use of such market opportunities offered by them. South Korea, neither a NAM member nor a close ally at the UN, arguably benefited significantly from US-tied market access agreements.

While some NAM members such as India and China developed important industrial strengths, others split their memberships across various technology transfers, trade pacts, and investment clubs. International political economy constructed on "Third World" analysis of development rests on situating NAM countries within Cold War origins. It often selectively uses dependency theses and offers a mixed picture of Bandung's importance today, unable to explain the institutional variety within and outside NAM as a function of technological learning and innovation. Rather than multiple pathways or technology choices available "off-the-shelf" and costless in learning to all countries, the technological capability literature emphasizes how knowledge and technology transfer contests were deeply constrained. Only those nations that have existing capabilities and dynamic firms, and regulatory and policy environments that are relatively agile at any given moment, are able to enter into global networks and supply chains, or decisively manage their self-reliance and autonomy.

This systemic view of learning is in direct contrast to traditional "Third World"-ism and national industrial analyses, which can provide fewer answers to institutional variety across countries, industries, and within countries. Furthermore, dominant financial architectures of investment and donor priorities have both appeared to support "North"-"South" classifications of countries and argue for post-colonial or

industrializing similarities, rather than overt attention to divergence. Fluid geopolitical membership exposes some of the classification challenges for national institutional bundles. Brazil and South Korea, two industrial archetypes and outside the traditional NAM club nevertheless share many similarities. The overlapping clubs have proliferated (Table 1).

In more recent years, it has seemed difficult to reconcile early solidarity or Cold War alliances as the basis for a shared future. Asian and Latin American clusters of different direction and scope have proved resilient to easy conclusions about development. They have thrived in different periods of dynamism and are best explained through institutional variety and how these environments were managed (Rasiah and Vinanchirachi 2012). Furthermore, the focus on potentially divergent institutional pathways can take evolutionary analysis into ambiguous evolutionary political economy terrain about development. Even more explicit controversy brews in addressing local production and innovation capabilities. Development has often been posed as a learning and "catch-up" process. Can Schumpeterian frameworks, which focus on production and innovation, help? This is the focus of the next case.

4.2 Case 2: Institutional and organizational variety in neo-Schumpeterian perspectives

Rather than uniquely controlled through national, centralized plans as the Bandung debate is inevitably framed, in fact institutional variety is inherent to the national project because of the various sub-systems of innovation dynamically changing and

Table 1 Geopolitical club memberships

Country	"Origin World" of national development	Select trade bloc/club memberships
Cuba	Second World (Marxist-Leninist, single party) NAM	G77
India	Third World, NAM (socialist mixed-market republic, parliamentary democracy)	G20, G77, BRICS, emerging economy, "Enhanced Engagement" Country EEC/OECD
Brazil	Third World (NAM observer only)	G20, G77, BRICS, emerging economy, EEC/OECD
Thailand	Third World (constitutional Monarchy, and former military leader elected Prime Minister), NAM	G20, G77, BRICS, emerging economy, OECD, ASEAN
Indonesia	Third World (Military-led), NAM	G20, G77, BRICS, emerging economy, EEC/OECD ASEAN
Egypt	Third World (Military-led, later democracy) NAM	G77
South Korea	Third World (capitalist; Military-led, later democracy)	G20, OECD, ASEAN
Chile	Third World (capitalist; presidential democracy now), NAM	OECD, G20, G77 (only OECD member exception)

Source: Adapted from Srinivas (2018b). Memberships are fluid

actively steered at national, sub-national, and sectoral levels. Micro-level data show that industry sectors adopt different routes that help in part to build theoretical frameworks e.g., Innovation Systems (Malerba and Nelson 2012). While it is evident that theoretical constructs for innovation can be rooted in different assumptions about economic activity and use different methodologies, the history of economic thought can show why. From the diverse assumptions in economics of Smith, Marshall, and Schumpeter, for example, have come considerably starkly different approaches to differences between Innovation Systems frameworks and those of Self-Organization or Cumulative Causation for example (Robert and Yoguel 2016). While each recognizes institutional variety, their explanations vary on how the variety emerges and is resolved in the institutional context. In most growth models, qualitative change is recognized but only accommodated ex-post (Saviotti 1997); in innovation systems, institutional variety as a part of this qualitative change is treated ex-post which is developmentally problematic because it cannot explain ex-ante intervention nor explain the conditions under which institutional variety may be good for development, i.e., "innovation systems" as a product of analyzing industrialized economics may be normatively driven (Arocena and Sutz 2000).

Since the early 2000s, considerable dissent of this nature has emerged about development and inequality and especially the role of the state and of variety in market institutions even with those studies with Schumpeterian sensibilities (e.g., Arocena and Sutz 2000; Srinivas and Sutz 2008; Chataway et al. 2014; Kaplinsky 2011). Economics has explained the rates of growth and nature of institutions since the 1950s until the 1980s using varied lenses of institutional change with more traditional assumptions about technology, knowledge, and learning (e.g., Marx and Lewis (1954)), while from the 1980s, more overt evolutionary analyses in both state-led neo-Marxian political economy and neo-Schumpeterian analyses emerged (e.g., Nelson and Winter 1982, Lall 1983, 1988; Amsden 1989). Therefore, with evolutionary political economy (EPE) traditions, especially of innovation, a useful natural experiment of sorts presents itself to scrutiny. In Robert and Yoguel's (2016) analysis, the Smith-Marshall-Schumpeter combination in complexity analysis can lead to two paths—one focused on Knight and Hayek, the other on Young-Kaldor-Myrdal-Hirschman, with the latter more focused on divergent trajectories.

The nature of evolution as a framework explanation comes under scrutiny because variety is linked to its explanation of dynamism in development, which in turn the authors argue is manifested in development's value priorities. "[..] emphasize that such value-neutrality requires closer analysis because the neo-Schumpeterian thinkers do appear to acknowledge that capitalism itself is an uneven, dynamic process of historical development. Precisely because of this acknowledgement, the relationship between the vital dynamism of such technological change and the context of its power relations and values deserves further attention" (Papaioannou and Srinivas 2019). Thus using the several analytical explanations within the neo-Schumpeterian body of EPE scholarship, we can probe further for systemic explanations of institutional variety in the building of technological capabilities (Papaioannou and Srinivas 2019). These can then offer preliminary assertions about how variety is only "developmental" under certain conditions. Table 2 (Ibid.) demonstrates a range of contention on development and this institutional variety. Global Value Chains, Innovation Systems (or Systems of Innovation), Sociobiology, "SPRU 1st generation" of evolution and development, and a body

Table 2 Differentiation within neo-Schumpeterian economics paradigm

Innovation "Schools"	Sample protagonists and primary institutions	Broad approach (Cohesive Systems, CS; Fragmented Systems, FS), Attention to explicit development priorities for innovation
Global Value Chains 1	States, firms, workers, Standards and Trade	CS, High
Global Value Chains II	Firms and their innovation ecosystems, Standards and Trade	CS, Low in early studies
Innovation Systems I and II	Innovation Systems, firms	CS, Low, moderate
Sociobiologists	"Agents" individuals, firms, free markets, intellectual property regimes.	CS, Low
SPRU 1st generation	States, firms	FS, High
Inequality, Innovation, Development (IID)	States, firms, non-profit organizations, non-state institutions, democracy and public reform	FS, High

Source: adapted from Papaioannou and Srinivas (2019)

of literature on Inequality, Innovation and Development (IID), all offer explanations of why institutional variety exists and, to different degrees, why this matters for development.

There are several contentious variables among Schumpeterian perspectives. Identifying the agents of importance differentiates Global Value Chains (GVC) I and II perspectives from other evolutionary scholars such as sociobiologists based on the developmental attributes of cohesive systems: some GVC studies have differentiated between labor inequality, wage, health, and safety concerns from those that are focused on how firms move "higher" through manufacturing value addition in GVCs. The extent to which firms are studied in wider complex ecosystems affects the nature of institutional variety as an explanatory variable: "[..] while the creation of variety and diversity in biology is random in a totally exogenous way, it is within economic systems partly the result of a division of labor between different firms and other organizations. This creates interesting coordination problems in resource allocation and in finding ways to filter an organization's innovative ideas so that those not being applied in one organization may be transferred to others" (Andersen 1997). Production network studies focused on understanding which types of learning are accelerating and robust, use a range of institutional contrasts. Institutional environments beyond market-based improvements, such as those including industrial policy, regional production specialization, global value chains, and global production sharing, can have important cross-sectoral effects and structural implications such as the impact on smaller firms. Thus both industry and country learning effects evolve (see Rasiah and Vinanchiarachi 2012; Rasiah et al. 2016).

Similarly, "Inequality, Innovation, Development" (IID) innovation scholars focused primarily on developing economies tend to identify a wider range of protagonists and

wider types of innovation. Their focus is firms and their learning environment. Institutional variety results in patterns of learning and innovation ("informal", "below the radar", "scarcity-induced", "bottom of the pyramid") (Papaioannou and Srinivas 2019). Institutional variety can manifest as a complex analytical challenge of highly fragmented, unequal and dynamic systems in which states have specific challenges. Sociobiologists who are equally interested in evolution and innovation make different choices in primary variables and explanations (Ibid). The fact that different EPE approaches in the Schumpeterian tradition exist and are consistent with the overarching framework of innovation studies is unexceptional in itself. However, for the Schumpeterian EPE tradition to thrive, diverse explanations for institutional variety must have a methodology to reconcile inferences and judgements.

Single industry analyses are one systematic way to dive deep and explore how national contexts generate different types of institutional variety and policy for industrial strategies. This is case 3.

4.3 Case 3: Institutional variety in a single industry across "late" industrial nations

Industry growth rates and why they vary sharply differentiates neoclassical versus EPE explanations. While empirical variations in the sector growth rates are consistent with growth theories, explanations for the variation reveal fissures in microeconomics assumptions of how firms learn and the impetus for growth (Nelson and Winter 1974). When diverse institutions in one country become difficult to study, other approaches are required. Case 3 is single industry-focused to analyze "late" industrial development.

Single industry explanations often use assertions about knowledge absorption, innovation, business organizations and public policy in order to explain why one national industry differs from another. Furthermore, the simple difference between macroeconomics and microeconomics breaks down when inference about institutional variety is made more explicit in a single industry. The inference thread that connects learning to firm behavior and onto industrial organization thus lies at the heart of several analyses of technological capabilities using EPE including those of neo-Schumpeterian and Austrian schools and extending to development scholars such as Myrdal (Robert and Yoguel 2016). The effect of habits and routines can be used to distinguish the different dynamics of self-organization, cumulative causation, and feedback (Ibid.). If societies can successfully combine and embed new forms of knowledge into their firms, other constructs such as innovation, cumulative causation, or path dependence can explain coordination and novelty in traditions such as neo-Marxian political economy (e.g., Amsden 1989), emergent knowledge (Metcalfe 2010), technological paradigms (Dosi 1982), or variety and demand (Saviotti 1994, 1996). Some are more "developmental" as case 2 has discussed.

While cross-industry learning offers one way of contrasting countries and thus theoretical paradigms of development and attendant institutional variety (e.g. Rasiah et al. 2016), single industry analyses does the same. Single industry analyses thus offer promise for the institutional context for deployment of instruments of technological advance in "late" industrial development. For example, procurement in the design of industrial policy plays an important role in some countries but not others, but can be analyzed further using single industries. Single industries across countries provide explanations for how learning can be

more effectively state-led (Lee and Mathews 2012). Single industries also demonstrate how specific policy instruments can dominate or cause havoc. Price regulations in the health industry for example can rapidly shape an industry's profile across treatment categories (Sahu 1998; Chaudhuri 2019), and while advancing the development argument for access and affordability, can still blunt the learning opportunities within products and across sub-sectors (Abrol 2004). Furthermore, within the industry, some nations such as Zimbabwe (Russo and Banda 2015) may use strategic procurement to develop local production responses to essential medicines such as morphine or antiretrovirals (see Mackintosh et al. 2016). Such EPE-linked analyses, even when amenable to notions of learning and innovation, need to be compared to build more robust inferences and economic judgment.

Taxonomies of institutional variety greatly benefit from detailed, single industry cases. Instead of fixing on markets or states where nations are separated by "catch-up" production capabilities, Srinivas (2012) provides a co-evolutionary heuristic of three separate institutional domains of production, demand, and delivery in which institutional variety is constantly generated and evolving. The domain of production of health technologies (the R&D, prototyping, manufacture etc.), consumption (though individual or collective buying instruments), and delivery (e.g., through clinics and hospitals) offers a conceptual tool to apply co-evolutionary and combinatorial lens to uneven technological advances over time. It can also reveal the uneven state's impact in national histories of the health industry. Other industries such as energy, food production, or education can also use the heuristic (Fig. 1).

The analytical value of the heuristic makes inferences about how to disentangle "lateness" of industrial development. It explicitly acknowledges the time-bound, and thus uneven nature of the how, why, when of institutional variety. It recognizes combinatorial elements that separate Germany, India, Brazil, or Cuba, despite impressive histories of pharmaceutical production, vaccines, or diagnostics capability, but with uneven consumption and delivery instruments. The heuristic assumes that firm-level analysis of products and processes and industry-level technology evolution requires a closer scrutiny of the instruments of industrial policy. Theory builds on differentiation within the three domains where specific institutional variety is visible. Over time, specific patterns of development become more evident: e.g., innovation, proprietary knowledge, stakeholders in rents extraction, and thresholds for state intervention. The heuristic helps track different national "snapshots" of economic

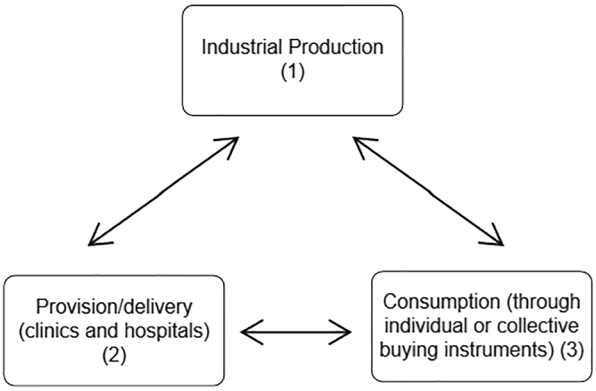

Fig. 1 Institutional triad

development and health priorities by analyzing industrial policy design, origin and growth of competitive export firms, dependence of government revenues on export versus domestic priorities, or types of scalable innovations (e.g., prosthetics) emerging from outside traditional R&D labs. Seemingly "comparable" countries on a production analysis (e.g., Brazil or India) would reveal important differences in other co-evolving dimensions.

The inferences are thus strongly embedded in an evolutionary framework. The qualitative heuristic asserts that institutional variety in a single industry offers nested analysis about the nature of EPE and evolution type: nations more successful in one health sector than others (*Institutional variety in health policy*); nations more successful along one triad dimension (*Institutional variety within sectors*); nations with time-limited capabilities (*Institutional variety over time*); nation-states and exogenous factors especially for export capabilities (*Institutional variety within nation-states*). Single industries generate inferences of the type of co-evolution with context-specific and time-bounded inference about institutional variety's implications. For example, some countries may successfully build, but unsuccessfully maintain, vaccines, generic drugs, and medical device capability. Adapting to growth and maintaining momentum for learning requires attention to cross-industry and sub-sector regulatory and problem-solving capacities. The evolutionary sensibility and reflected in the heuristic makes more visible that technology-focused innovation and learning perspectives in EPE can be analogous if not strictly comparable to EPE approaches in administrative governance, policy design, and regulation schools, since these are concerned with how to enable and coordinate multiple stakeholders, but inevitably move further away from those schools focused solely on state-led development or determinist assumptions of technological advance.

4.4 Case 4: Institutional variety and product innovation contexts for learning

As case 3 demonstrated, rather than focus on "optimal" national configurations in industrial development or claim a solidarity that is elusive as in case 1, it can be helpful to mine single industry-specific diversity in innovation and learning. Rather than cherry picking or hiding behind normative notions of industrial development in the health industry, it can help to make the inferences of institutional variety more visually explicit in development.

Case 4, focused here on innovation in development, is a distinct subset of the technological capabilities debates of cases 1–3 because its object of enquiry is the innovation process itself. Institutional variety can explain cross-product and cross-national differences in the ability to innovate (e.g., prosthetics, water potability, automotive, vaccines). While production (especially manufacturing) capabilities are robustly analyzed, in fact generating a substantial body of the early literature of innovation systems and GVCs for example, the development bias of directionality of innovation remains, i.e., more visible in industrialized economies. In "Imitation to innovation" (Kim 1997) argued that South Korea's industrial transformation rested on technological capabilities built through systematic institutional efforts of imitation, with a close eye to knowledge systems and technology transfer established elsewhere, and resulting in "Imitation to Innovation." Innovation was desirable but not necessary at the outset, when "imitation" capabilities mattered more. Innovation, distinctive types of learning and the institutional environments they require locally can clash with conceptual frameworks and metrics (Arocena and Sutz 2000; Srinivas and Sutz 2008). For example, that certain types of small firms insert into GVCs despite considerable hurdles

is now well recognized empirically but absent theoretically, as are studies of certain geographies with organizational and learning features that may be under-recognized (e.g., Kaplinsky 2011; Chataway et al. 2014; Kraemer-Mbula et al. 2019). Even in single industries (such as in case 3) where the global norms may be well established, specific types of production and innovation capability, essential to both manufacturing and health services, are poorly documented and analyzed.

To highlight different types of innovation thus requires a more dynamic taxonomy through which a firm can "travel," in turn revealing institutional variety in its environment as it grows. The figure below provides a taxonomy of four quadrants of innovation using institutional variety as an explanation that splits the world into advanced industrialized countries (AICs) and developing countries (DCs) (Srinivas and Sutz 2008). Idiosyncratic, unexpected, difficult to explain innovation capabilities are the focus and the "clock" begins for many industrialized countries in the upper left-hand quadrant. This dominant model includes those nations which are able to be technologically more sophisticated through trade insertion, adaptation of existing products, and ability to establish self-reliant production. They may mimic some of the indicators of industrialized nations with formal R&D labs and large ecosystems of corporate hubs of research or marketing. Alongside, they may have a smattering of products in other quadrants (Fig 2).

The explanation in this heuristic rests on inferences derived from a two-level analysis of innovation phenomena observed in developing countries: one level focuses on cognitive questions of how learning occurs (in firms or other ecosystems of organizations), the second on structural explanations of national pathways of trade (make versus buy). The argument is that innovators in developing (industrializing) countries exist within an industrial landscape dominated by trade with industrial economies (the upper left-hand quadrant). Combined, the cognitive and structural

	Problems for which solutions have been found in AICs	Problems for which solutions have not been searched or found in AICs
Problems for which solutions suitable for ICs conditions exist	The vast majority of solutions acquired through technology transfer (eventually with minor modifications)	Solutions to problems mainly posed in ICs and developed locally
Problems for which solutions suitable for ICs conditions do not exist	"Canonical" solutions exist, but for different scarcity reasons they are not suitable for ICs conditions	No solutions (yet) Typically health issues

Source: Adapted from Srinivas and Sutz (2008, p. 136)

Fig. 2 The 4 quadrants of a scarcity-induced framework

features can be represented in 4 quadrants in each of which some types of innovation occur but which may not always be well-recognized by supportive national and local development policies. International economic governance especially trade is implicated here as causing the split between cognitive and structural features. Product "populations" can be sorted into these 4 quadrants, to separate out those products that may innovate to serve a local population or solve some especially pressing problem, but may also generate global pathbreaking science, new materials innovations, or new and rapid forms of manufacturing innovations.

The framework can be extended to differences between countries based on micro-level heterogeneity in products. For example, prosthetics production occurs disproportionately in some countries such as India and has grown from the non-profit, not business sector in contrast to prosthetics from the U.S. which may have grown in university-hospital networks. The Jaipur Foot, a product from a non-profit environment, has now become a global product especially relevant for developing economies. It has unique characteristics of materials use, customizable design, and available to adaptation in any number of physical environments. Similarly, an innovative Cuban vaccine for pediatric meningitis comes from a non-democracy and public sector effort, with significant innovations in the off-diagonal quadrants. For health innovations, the heuristic here can be complementary in implications to the single industry-focused heuristic of case 3 but can challenge it further in cases such as neonatal incubators, breast cancer diagnostics, and many vaccines. The heuristic's use forces the framing of development as historical specificity and path dependency (specialization within quadrants) and dynamic (how can firms and an economy adapt and move between quadrants). Posed in this manner, inferences can be made more explicit and judgments more cautious about learning and innovation.

5 Contributions of evolutionary political economy to development and economics

The preliminary methodology discussed in the prior section laid out 4 separate cases of the author's research into development phenomena of technological change. All are sympathetic to evolutionary political economy, each able to articulate some aspects of industrial dynamism with innovation and learning. The cases represent persistent and influential concepts in economic development such as national convergence, growth, divergence across single industries, and product innovations. The four cases moved toward the development of taxonomy with propositions or conceptual steps about how the study of institutional variety can be made more explicit within paradigms, in order to reveal inference and refine judgment. The cases have been structured as brief composites and in two instances with visual heuristics, of how "given" development phenomena such as learning and innovation in industrial development can lead to diverse inferences and judgements about technological capabilities and their consequences. The appeal to taxonomy recognizes, as the *Nyāya* school proposes, that further refinement can offer more explicit relations to develop between those inferences that convince us versus those that will be needed to convince others. These communities may be mainstream versus pluralist, neoclassical versus other economics or more productively, as has been argued in this article, EPE itself.

The prior sections used qualitative heuristics, shorthands or schematic conceptual differences, to illustrate 4 preliminary inference categories about technological capabilities. In case 1, the focus was institutional variety situated as historical nation-building in which the "global South", "LMICs" or other classifications are labels to explain which institutional bundles dominate. In case 2, to differentiate among diverse neo-Schumpeterian frameworks which make different assumptions about institutional variety, developmental actors, and possible policy priorities. Case 3 focused on single industry and cross-national analysis, to infer the nature of policy-supports and an evolutionary, historical timeline to the health industry. While cases 1, 2, 3 have all assumed the nation-state, other qualitative heuristics as in case 4 can be used in which product innovations become the unit of analysis and learning and innovation are explicitly discussed as a developmental goal. Case 4 was used to understand the institutional variety underlying cognitive and structural facets of learning. Both dominant and neglected product innovations emerge with policy consequences for make versus buy, and local customization needs. The off-diagonal elements represent developmental promise but also policy neglect. Cases 3 and 4 lend themselves to potential iterative analysis of origin scenarios and simulation over time.

As cases 2, 3, and 4 imply, institutional variety although often recognized as correlated to innovation or signaling creativity does not automatically suggest causation. Firms or other organizations learn and innovate *despite* or *because of* institutional variety. Normative frameworks in economic development and the sub-discipline of development economics can thus implicitly favor those states and economies which appear to mimic industrial economies with a limited institutional palette, and overly rely on evaluation of traditional indicators such as size of firm, R&D investments, or patents. The inference underlying such analysis and interpretation of the history of economic thought is that those economies thrive which are able to convert and coordinate institutional variety to economic growth and dynamism. However, the inference about the phenomena of institutional variety can have distinctly different implications for the building of technological capabilities in economic development. One inference is that institutional variety ("too many ways of doing things") can degenerate into disorder and inconsequential or fragmented knowledge; another might be that such variety could be a hallmark of creativity and innovation. Furthermore, as single sector cases show, the many different ways of technologically advancing might remain difficult to corral into single explanations. As cases 3 and 4 demonstrate in different ways, if the evolutionary analysis is taken further, a single aspect of the co-evolution or of activity within a quadrant reflects a given (and intermediary) institutional combination, not a certain outcome. An iterative, simulation lens if applied, would show that the off-diagonal lens might be the most promising for development, but the most ignored by policy design. It is clear from the different developmental judgements, which can only be discussed here in brief, that reconciliation must trace back to more overt deliberation on inference. Such deliberation will require more explicit attempts to improve methods (even in these cases) that can contribute to more systematic cross-EPE theories and evidence of learning and innovation.

Rather than be overly concerned with responding exclusively to dominant paradigms of innovation or learning, one must return to observation: If variety is considered a theoretical centerpiece, how does one order this variety? Is institutional variety more or less strictly tied to representing variation and implications for selection and retention/replication in the VSR framework? Order can be described in terms of coordination challenges versus the need for attending to change dynamics (Dosi and Orsenigo 1988),

and its theoretical solidity able to address industrial dynamics and structural change (Nelson and Winter 1982; Silverberg et al. 1988). At the same time, meta-frameworks and themes become important points of difference among the evolutionary traditions. Variety is one of these, which can be captured in terms of its evolutionary attributes in different ways (see Robert et al. 2017). "The dimension micro heterogeneity considers two attributes: the differentiating strategies of agents endowed with creative capacity, and heterogeneity derived from learning and adaptation processes in different evolutionary paths. The former is less mentioned than the last one in the average." (Robert et al. 2017). But micro-heterogeneity can be countered by other explanations of neo-Schumpeterian analysis such as emergent properties or network architecture that themselves possess different ontological assumptions about evolution and therefore the impact on innovation research.

Evolutionary political economy (EPE) traditions offer some promise for the resolution of this debate. What we "see" as given in development is what we have inferred from specific phenomena through conceptual frameworks in economics. The challenge is that paradigms of technological learning and innovation may not always be commensurate across the discipline nor the inferences and judgments easily reconciled. These ontological differences within the evolutionary traditions of wider evolutionary political economy (EPE) can benefit from resolution within the traditions themselves if economics is to advance, rather than be overly concerned about the boundaries of the discipline which will be continually redrawn in any case. "Inclusion and exclusion are not so much the unambiguous outcomes of settled conflicts as they are the weapons *and* the stakes in an ongoing manifest or latent confrontation. The definition of the battlefield and of the admissible participants are both stakes and weapons." (Baumberger 1977, 13). To avoid a normative slant toward a universal optimum or of convergent innovation patterns common within mainstream enquiry, recognition of variety within and across such "systems" and their relational components of actors and organizations, becomes both a core focus for development analysis and a policy subject in itself (Arocena and Sutz 2000). For example, all 4 cases successively build on the question of the "ex-post" nature of development theories and lend well to notions of fragmented and divergent development which have important implications for evolutionary economics and political economy. The different traditions of fragmented, divergent evolutionary attributes constitute scholars with different interests in innovation for development, where considerable dissent exists in whether innovation is best exemplified within existing industrial traditions or not (Papaioannou and Srinivas 2019). Rather than fighting the internecine warfare of economics against economics, the *Nyaya* School and its reasoning techniques reminds us that attention to intra-paradigmatic inquiry allows greater refinement of both inclusion and difference of perspective on institutional variety and generates conditional knowledge essential to strengthen the discipline.

Evolutionary political economy (EPE) represents an important disciplinary opportunity to advance inter- and intra-paradigmatic thinking. As we have argued, if development economics is seen as the analysis of development phenomena, then a more overt process of inference is necessary to understand the range and consequences of institutional variety as a set of empirical phenomena. Theoretical frameworks within EPE that follow from such inferences can better explain institutional variety's impact on the how, when, and why of technological capabilities in economic development. Without this, economics remains with a scientific challenge regarding its sources of knowledge, its hidden inferences, and its judgments of institutional variety in development and how to respond.

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